

REMARKS/ARGUMENTS

Examiner Dravininkas is thanked for his ongoing review of our application.

Overview of the invention:

As track densities increase, it becomes increasingly important to prevent accidentally writing data outside the boundaries of a track, including on an adjacent track. A secondary lower magnetic pole design for a write head is described that achieves this by being closer to the ABS than the primary lower pole. It takes the form of a ledge that terminates at the ABS, said ledge resting on a non-magnetic layer.

Reconsideration is requested of the rejection of claims 4-10 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement:

Examiner argues that it can clearly be seen that '...ledge 41 is not only separated from the upper pole 11 by the write gap 13 but by the coils 14 and the coil insulating layer as well. Further, in the back portion of the write head, the upper pole 11 is not at all separated from the ledge 41 but in direct contact with it.'

The above argument is based on a misunderstanding of what the invention has defined as a ledge:

(i) In the claims – claim 4 states (in part with relevant phrases highlighted):

a second layer of high magnetic permeability material that serves as a **secondary lower pole that fully covers and contacts said primary lower magnetic pole** and said first non-magnetic layer, above which **it serves as a ledge having a width**;

a field coil over, and insulated from, said primary and secondary lower poles; an upper magnetic pole that overlies said field coil, contacting said secondary lower pole at a second side that is opposite to said first side, and that is separated from said ledge at said first side by only a second layer of non-magnetic material that is a write gap, said upper magnetic pole having, at the write gap, a width equal to said ledge width, whereby it defines a track width;

**said ledge extending away from said primary lower pole by an amount**

(ii) In the figures – FIG. 11 shows **ledge 112** extending away from second layer 110 of high magnetic permeability material (i.e. the primary lower pole).

(iii) In the specification -- page 6 third paragraph starting on line 2, it states:

For purposes of simplification, FIG. 4 has been drawn as though ledge 41 is a cantilever.

(iv) In the specification -- page 9 2<sup>nd</sup> paragraph, starting at the middle of line 3, it states:

Second layer 110 of high magnetic permeability material is next deposited and patterned to form a secondary lower pole that covers primary pole 12 and extends over insulating layer 91 on one side so as to form **ledge 112**.

#### Counter-argument

For purposes of simplification, not all elements that comprise FIG. 4 (on which examiner bases his argument) were shown. However, as noted in (iii) above, element 41 has been drawn “as though ledge 41 is a cantilever”. This statement was intended to make it clear that element 41 (as designated in FIG. 4) refers to only the unsupported portion of the layer lying immediately above layer 12.

In retrospect, we accept that examiner might not have found the remarks in the specification that pertain to element 41 to be as helpful as was intended. Unfortunately, examiner appears to have not realized that the details missing from FIG. 4 are all shown in FIG. 11, as noted in (ii) above. Once FIG. 11 is consulted, it becomes clear that (as recited in claim 4):

“... upper magnetic pole ... is separated from said ledge at said first side by only a second layer of non-magnetic material that is a write gap”

Reconsideration is requested of the rejection of claims 4-10 under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US 6,791,793) in view of Takano et al. (US 2002/0080521):

Examiner argues (by implication) that, by turning Chen's FIG. 7 upside down, a structure that is patently indistinguishable from our FIG. 4 (as described in our claim 4) will be obtained. We believe this to be incorrect and reproduce below the relevant text in our claim 4 with appropriate comments. We have retained the various numbers used by Chen to designate his elements (as provided by examiner) and have appended to these (in italics) the numbers that we have used to designate the corresponding elements in our FIG. 4:

a magnetic write head, having an air bearing surface (ABS), comprising:

directly on a non-magnetic substrate a first layer (96, 12), of high magnetic permeability material, having, on a first side, an edge whose surface is normal to said substrate and parallel to said ABS, that serves as a primary lower magnetic pole; (see fig. 7, col. 6 lines 6-23)... **PLEASE SEE COMMENT [1] BELOW**

a first non-magnetic layer (98, 91 *in our FIG. 11*) that contacts said first layer of high magnetic permeability material only at said edge and extends away therefrom, said non-magnetic layer having a top surface that is coplanar with that of said primary lower magnetic pole; (see fig. 7, col. 6 lines 6-23)... **PLEASE SEE COMMENT [2] BELOW**

a second layer (108, 41) of high magnetic permeability material that serves as a secondary lower pole that fully covers and contacts said primary lower magnetic pole and said first non-magnetic layer, above which it serves as a ledge having a width; (see fig. 7, col. 8 lines 7-16)

a field coil (94, 14) over, and insulated from, said primary and secondary lower poles; (see fig. 7, col. 5 lines 58-67)

an upper magnetic pole (90, 11) that overlies said field coil, contacting said secondary lower pole at a second side that is opposite to said first side, and that is separated from said ledge at said first side by only a second layer of non-magnetic material that is a write gap, said upper magnetic pole having, at the write gap, a width equal to said ledge width, whereby it defines a track width; (see fig. 7, 8 col. 5 lines 50-57)... **PLEASE SEE COMMENT [3] BELOW**

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said ledge extending away from said primary lower pole by an amount; and (see fig. 7)

said secondary lower pole having a thickness that remains unchanged over said secondary lower pole's entire length. (see thickness of 108) (see fig. 7).

After noting that Chen fails to disclose that "the substrate is a non-magnetic substrate" examiner cites Takano as teaching "a magnetic writing head having a substrate (5) made of alumina titanium carbide (see fig. 5, para. 0064)" and argues that it would have been obvious to make the substrate of Chen out of alumina titanium carbide, the motivation for doing so being to increase wear resistance of the substrate and to ensure electrical isolation for the magnetic write head... **PLEASE SEE**

**COMMENT [4] BELOW**

**COMMENTS:**

[1] The substrate onto which layer 96 has been deposited is layer 102. Chen refers to layer 102 as the main magnetic pole so it MUST be magnetic.

[2] Chen refers to element 98 as a 'recess'. Chen provides no information concerning the magnetic properties of element 98.

[3] Chen's element 90 does NOT contact secondary lower pole 108, being separated therefrom by element 92.

[4] Since Chen's substrate (according to examiner) is main pole 102, making layer 102 non-magnetic would render Chen's device totally inoperative! One skilled in the art would therefore NOT select a non-magnetic material for layer 102.

We also note here that substituting a more wear resistant material for layer 102 would be counter-productive since this would make formation of the ABS more difficult

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by virtue of the harder material's tendency to protrude outwards following grinding and polishing.

Claims 5-10:

Applicant believes that, based on the foregoing arguments, the rejection of claim 4 under 35 USC 103 and/or 35 USC 112 has now been overcome and notes that claims 5-10 are all dependent on claim 4 and therefore are believed to no longer be subject to rejection under 35 USC 103 or 35 USC 112.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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